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# BULLETIN

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# Chicago Herpetological Society

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Volume 50, Number 6  
June 2015





# BULLETIN OF THE CHICAGO HERPETOLOGICAL SOCIETY

## Volume 50, Number 6

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**Cover:** Northern Mexican alligator lizard, *Barisia ciliaris*, from Sierra San Peña Nevada, Zaragoza, Nuevo León, Mexico. Photograph by Alan Kardon.

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## Notes on Mexican Herpetofauna 25: Associations of Herpetofauna with Agaves in the States of Nuevo León and Tamaulipas, Mexico

David Lazcano<sup>1\*</sup>, Silvana Pacheco-Treviño<sup>2</sup>, Manuel Nevares de los Reyes<sup>1</sup>, Javier Banda-Leal<sup>1</sup>  
and Carlos Barriga-Vallejo<sup>1</sup>

### Abstract

To increase the knowledge of the herpetological activity in various species of agaves, we visited different sites: San Isidro Canyon, Casa Blanca Canyon, Sierra de Gomas, Pablillo, Puerto Cieneguillas, Sierra San Antonio Peña Nevada, Nuevo León, Mexico and La Marcela, Miquihuana, Tamaulipas. We found a close relationship between the agaves and herpetological activity; we also found that some large agave species could provide not only refuge, but also sufficient space for foraging and thermoregulation/basking. *Agave gentryi* and *Agave montana* formed large aggregations, which increased herpetological activity. We suspect that agaves are used even more frequently than documented here.

Keywords: herpetological activity; agaves; association; behavior

### Resumen

En un intento por incrementar el conocimiento de la actividad herpetológica en las distintas especies de agaves, Se visitaron diferentes sitio como: Cañón San Isidro, Cañón Casa Blanca, Sierra de Gomas, Pablillo, Puerto Cieneguillas, Sierra San Antonio Peña Nevada, Nuevo León, México y La Marcela, Tamaulipas, México. Aquí encontramos un relación muy íntima entre los agave y la actividad herpetológica, encontramos que en algunos agaves por su tamaño proporcionaban el espacio necesario para llevar comportamientos de forrajeo, asoleamiento y refugio. Los conglomerados de *Agave gentryi* y *Agave montana* fueron los que presentaron una mayor actividad herpetológica, aunque sospechamos que los agaves son utilizados con mayor frecuencia que aquí se documentan, pero no fueron observados.

Palabras claves: actividad herpetologica; agaves; asociación; comportamiento

### Introduction

Agaves or magueys, together with yuccas and amoles belong to the family Agavaceae. Plants in this botanical group do not have an apparent stem, and in fact their fibrous roots begin with an underground stem called a rhizome. All species of the nine genera comprising that family are found exclusively in the Americas. Mexico is the center of diversity and family origin (Gentry, 1982; Garcia-Mendoza, 1995). Mexico is home to 76% of the approximately 300 species that make up the Agavaceae (Eguiarte and Souza, 2007).

Within the family Agavaceae, the genus *Agave* stands out by virtue of its cultural and economic significance, as well as its diversity. More than 160 species of agave (Eguiarte and Souza, 2007) are distributed from the southern part of Canada and southern United States, Mexico, Central America as far as South America. Despite its wide distribution on the American continent, Mexico is considered center of origin and diversity of species of agaves since 75% are distributed in the country and it is estimated that 69% of these species are endemic to the country (Garcia-Mendoza, 1995).

Agaves are perfectly adapted to dry, predominately arid or semi-arid environments. However, thanks to the diversity of

environments in Mexico, many species have adapted to temperate or tropical forest ecosystems. The presence of agaves in most Mexican ecosystems is extraordinary. These plants are considered key species, in terms of producing large amounts of resources (Garcia-Mendoza, 2007), especially in the reproductive stage of the plant, either as flowers, pollen or nectar, which



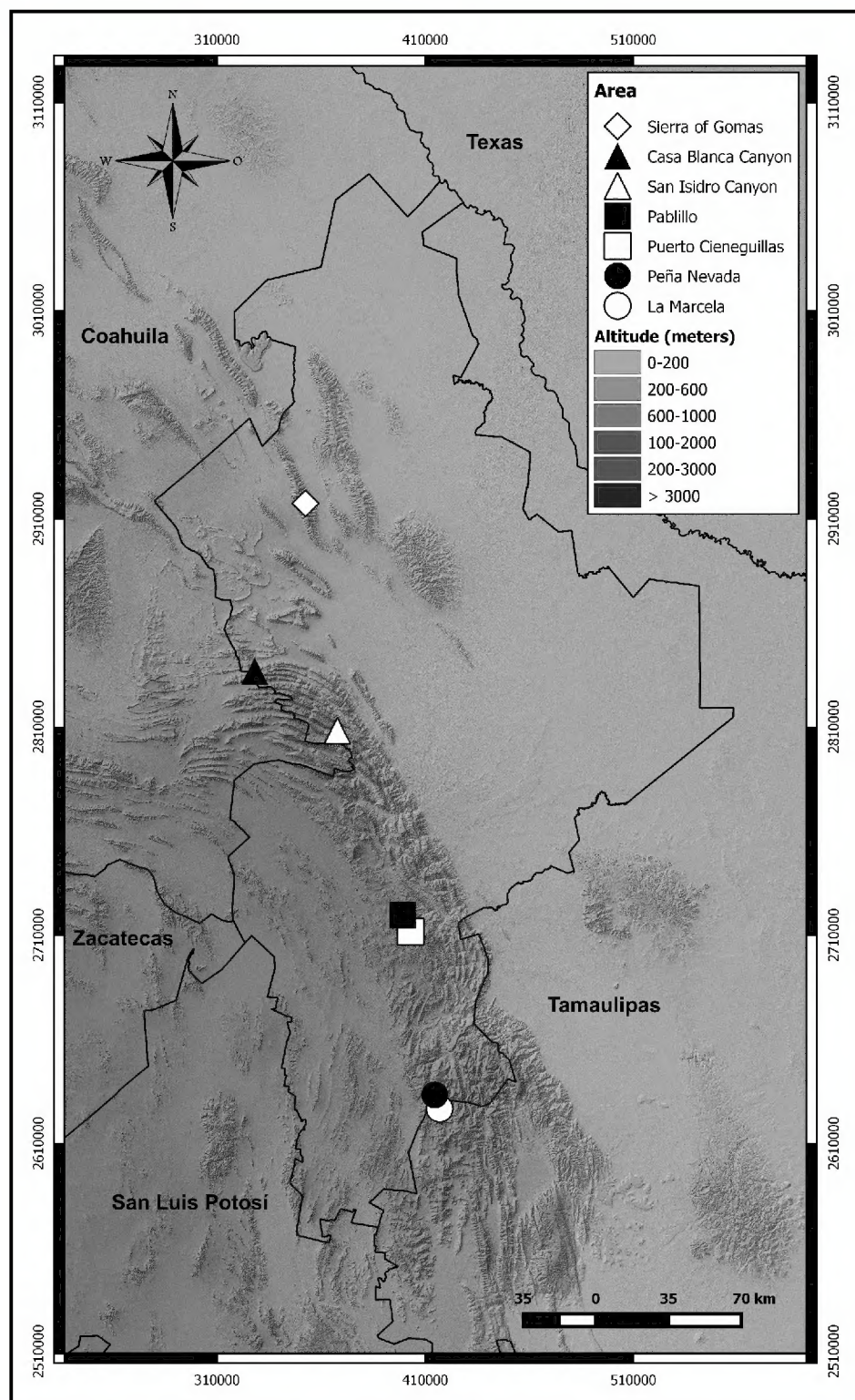
David Lazcano next to an *Agave montana* in Galeana, Nuevo León, Mexico. Photograph by Alan Kardon

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**Figure 1.** Study sites in Nuevo León and Tamaulipas, Mexico.

animals such as insects, bats and hummingbirds depend on. In addition the broad leaves store rainwater that not only provides liquid for the same plant, but also may help to sustain a wide variety of fauna (Eguiarte and Souza, 2007; Villarreal-Quintanilla, 2007; Castillo-Hernández and Treviño-Carreón, 2009). Agaves also may provide space or sites for foraging, thermoregulation/basking and refuge for many species of vertebrates and invertebrates.

In addition to their ecological importance in Mexico, there has been a close relationship between the people and agaves since pre-Hispanic times that remains to this day. Since these plants require little moisture, and adapt to places with poor soil conditions and extreme temperatures, they are a very useful resource in soil restoration management. Throughout history magueys have played an important role in the economy and culture of the country. They are used in the manufacture of distilled or fermented beverages (pulque, mescal, tequila), and for the tough fibers from their leaves (istle). They are also used for ornamentals, food, medicine, among other purposes (Alanís-Flores and González-Álvarez, 2010; Gentry, 1982; Castillo Quiroz et al., 2007; Anonymous, 2014). In the pre-Hispanic world pulque was considered a sacred beverage.

Various indigenous groups appreciated the large amount of resources that agaves provided them, considering them sacred. In

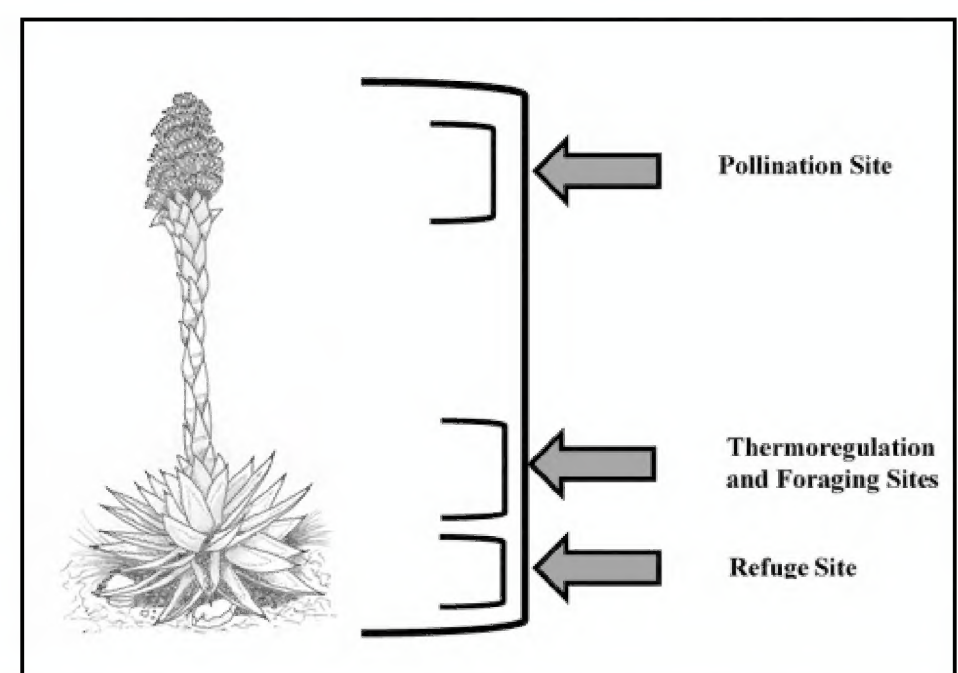
Nahuatl culture they worshipped the maguey goddess Mayahuel (Hinke, 2007); they discovered that the mead provided by many agave species was a source of sugar. Mayahuel appears in several codices, which highlighted her role as a provider of liquid, an essential element in the dry lands. In addition the goddess was worshipped as a symbol of fertility.

Beverages distilled from agaves (e.g., tequila and mescal) are of great economic importance to the country today, followed by the industry of the fibers extracted from some species (such as *henequen*, lechuguilla and *maguey sprat*) which are the raw material for the manufacture of ropes, floor mats, brushes, sacks among others (Alanís-Flores and González-Álvarez, 2010). Recently a Mexican archaeological journal published “El Maguey” (Anonymous, 2014) which documents many aspects of agaves, from archaeological evidence of the maguey in pre-Hispanic cultures to “El Pulque” the sacred beverage. We can only imagine native peoples’ encounters with a variety of fauna species inhabiting the interiors of their agaves, especially rattlesnakes.

In the northeast of Mexico, particularly in Nuevo León, magueys thrive in different landscapes, and occur in different ecological regions (Gentry, 1982), from the Sierra Madre Oriental, across valleys and plains, to desert scrubland. There are species that thrive in the rocky cliffs of the Sierra Madre Oriental like *Agave bracteosa* (squid agave / *maguey araña*), others that abound in higher altitudes up 2500 masl in temperate forests are: *Agave celsii* (peña century plant / *maguey de peña*), *Agave gentryi* (Gentry’s hardy century plant / *maguey verde*) and *Agave montana* (hardy century plant / *maguey de montaña*), and other species that support high temperatures and drought conditions in the desert areas of the state *Agave lechuguilla* (lechuguilla / *maguey lechuguilla*), and *Agave scabra* (rough agave / *maguey bronco*). Recently Lazcano and Pacheco-Treviño (2014) wrote on the association of agaves and herpetofauna in Sierra San Antonio Peña Nevada in Zaragoza, Nuevo León.

### Study Sites

We conducted separate analyses of herpetological activities in the field in diverse study sites in following localities: 1) Casa Blanca Canyon; 2) San Isidro Canyon; 3) Sierra of Bustamante Terrestrial Priority Region (Sierra de Gomas); 4) Pablillo;



*Agave montana* (hardy century plant / *maguey de montaña*). Leaves in the form of a rosette. Drawing by Liliana Ramírez-Freire.



5) Puerto Cienegillas; 6) Sierra San Antonio Peña Nevada; 7) La Marcela. The study sites were numbered in order of their distances from the Monterrey Metropolitan Area. We mention some of the most dominant plant species and mainly focus on the agave species where we observed any type of herpetological activity. This is the particular approach of this article, but we understand that every plant species performs an important function in the ecosystem. We also understand that the plants, as well as the herpetofauna, are distributed along an altitude gradient. There is a huge list of plant species for each plant community; it would be impossible to list them all. All plant communities included various agave species.

Brief Description of each study site:

#### 1) Casa Blanca Canyon

This canyon is located to the left of the federal highway #57 Monterrey-Saltito at km 41, in the municipality of Santa Catarina, Nuevo León. Rosetophilous and piedmont scrub elements are present on the limestone walls at the entrance of this canyon. At the base of the canyon, we found the following plant species: *Cordia boisieri* (Texas olive / *anachuila*), *Gochnatia hypoleuca* (shrubby bullseye / *ocotillo*), *Chilopsis linearis* (desert willow / *sauce del desierto*), *Dasyllirion texanum* (sotol), *Sophora secundiflora* (Texas mountain laurel / *colorín*), *Hechtia glomerata* (la guapilla), *Helietta parvifolia* (barreta / *barreta*), *Diospyros texana* (Texas persimmon / *chapote*), *Acacia berlandieri* (Berlandier's acacia / *guajillo*), *Leucophyllum frutescens* (white sage / *cenizo*), *Pithecellobium pallens* (ape's earring / *tenaza*), *Yucca filifera* (St. Peter's palm / *palma pita*) and isolated individuals of *Juniperus deppeana* (checkerbark juniper / *táscate*). On the limestone walls of the canyon, we found the following species: *Brahea berlandieri* (rock palm / *palma de las rocas*) and several cacti (*Mammillaria melanocentra*, *M. plumosa*, *Epithelantha unguispina*). Finally at higher altitudes of the area the vegetation changes into a pine-oak forest community with *Agave montana* (hardy century plant / *maguey de montaña*) coexisting with *Pinus remota* (Texas pinyon pine / *pino piñonero de Texas*) and *P. cembroides* (Mexican pinyon pine / *pino piñoner*). Important agave species found in the area are: *Agave bracteosa* (squid agave / *maguey araña*), *A. lechuguilla* (lechuguilla / *maguey lechuguilla*), *A. scabra* (rough agave / *maguey bronco*), and *A. striata* (narrowleaf century plant / *maguey espadín*), they are present throughout the altitude gradient which is from 1100 to 2500 masl. The canyon is located about 41 km west from the center of the Monterrey Metropolitan Area.

#### 2) San Isidro Canyon

This canyon is located in that portion of the Sierra Madre Occidental known as the Curvature of Monterrey, within the Parque Nacional Cumbres de Monterrey, Nuevo León, and this particular area is in the municipality of Santiago, Nuevo León. The canyon is located southwest of the municipality and is contiguous to the state of Coahuila. The canyon is approximately 2 km in length, at 1600 masl with limestone walls that are about 400 m in height. The vegetation along the stream is a gallery forest, with piedmont scrub and an oak forest community. On the canyon's rocky walls we can find rosetophilous scrubland with xerophilous plant species such as *Dasyllirion* sp. (sotol). The

canyon floor mainly contains piedmont scrub floristic elements such as: *Helietta parvifolia* (barreta / *barreta*), *Chilopsis linearis* (desert willow / *sauce del desierto*), *Cercis canadensis* (eastern redbud / *árbol de Judas*), *Gochnatia hypoleuca* (shrubby bullseye / *ocotillo*) and *Acacia rigidula* (blackbrush acacia / *chaparro prieto*), *Acacia farnesiana* (sweet acacia / *espinillo blanco*), *Acacia berlandieri* (Berlandier's acacia / *guajillo*), *Sargentia greggii* (yellow chapote / *chapote amarillo*), *Arbutus xalapensis* (Texas madrone / *madroño*) and several oak species like *Quercus cambyi* and *Q. fusiformis*. There is a gallery forest with a distinguishing element *Platanus occidentalis* (American sycamore / *alamo*) throughout the canyon. At higher altitudes the vegetation goes from oak to pine forest with the following species: *Pinus pseudostrobus* (Monterrey pine / *pino Monterrey*), *P. teocote* (red pine / *pino colorado*) and *P. arizonica* (Arizona pine / *pino blanco*). The main agave species present in the area are *Agave bracteosa*, *A. lechuguilla*, *A. montana* (hardy century plant / *maguey de montaña*), *A. scabra* and *A. striata*. They are present throughout the altitude gradient which is from 1540 to 2300 masl. The canyon is located about 41 km southwest from the center of the Monterrey Metropolitan Area.

#### 3) Sierra of Bustamante Terrestrial Priority Region (Sierra de Gomas)

There are several different plant communities in the area: in the submontane scrub plant community the dominant species are: *Acacia rigidula* (Blackbrush / *chaparro prieto*); *A. berlandieri* (Berlandier's acacia / *guajillo*), *Bernardia myricifolia* (mouse eyes / *oreja de raton*), *Eysenhardtia texana* (Texas kidneywood / *vara dulce*), *Forestiera angustifolia* (candlewood / *ocotillo*), *Helietta parvifolia* (barreta / *barreta*), *Leucophyllum frutescens* (Texas sage / *cenizo*), *Rhus pachyrrhachis* (wild currant / *lantrisco*) and *Schaefferia cuneifolia* (desert yaupon / *granadillo*). There is also an extensive area of xeric shrubland forest where we can observe: *Larrea tridentata* (creosote bush / *gobernadora*), *Pithecellobium pallens* (ape's earring / *tenaza*), *Acacia greggii* (catclaw / *uña de gato*), *Aloysia gratissima* (white-bush / *cedro de monte*), *Desmanthus virgatus* (wild tatan / *huizachillo*), *Zanthoxylum fagara* (wild lime / *colima*), *Cordia boissieri* (Mexican olive / *anacahuila*), *Porlieria angustifolia* (Texas guaiacum / *guayacan*), *Celtis pallida* (desert hackberry / *granjeno*), *Castela erecta* (Texas goatbush / *chaparro amargoso*), *Condalia obovata* (logwood / *brasil*), *Condalia spathulata* (knifeleaf snakewood / *hoja de navaja*), *Prosopis glandulosa* (honey mesquite / *chapote prieto*) and *Yucca filifera* (St. Peter's palm / *palma pita*). There are also scarce patches of oak forest of different species of *Quercus*. Vegetation in the upper parts of the mountain range is pine forest with *Pinus pseudostrobus* (Monterrey pine / *pino Monterrey*). The main agave species present in the area are *Agave americana* (yellow agave / *maguey amarillo*), *A. bracteosa*, *A. lechuguilla*, *A. ovatifolia* (whale's tongue hardy century plant / *maguey de lampazos*), *A. scabra*, *A. striata* and *A. victoria-reginae* (Queen Victoria century plant / *maguey de la Reina Victoria*). We can find these agaves in the altitude gradient which is from 500 to 2500 masl. Sierra de Gomas is located 70 km north of the Monterrey Metropolitan Area.

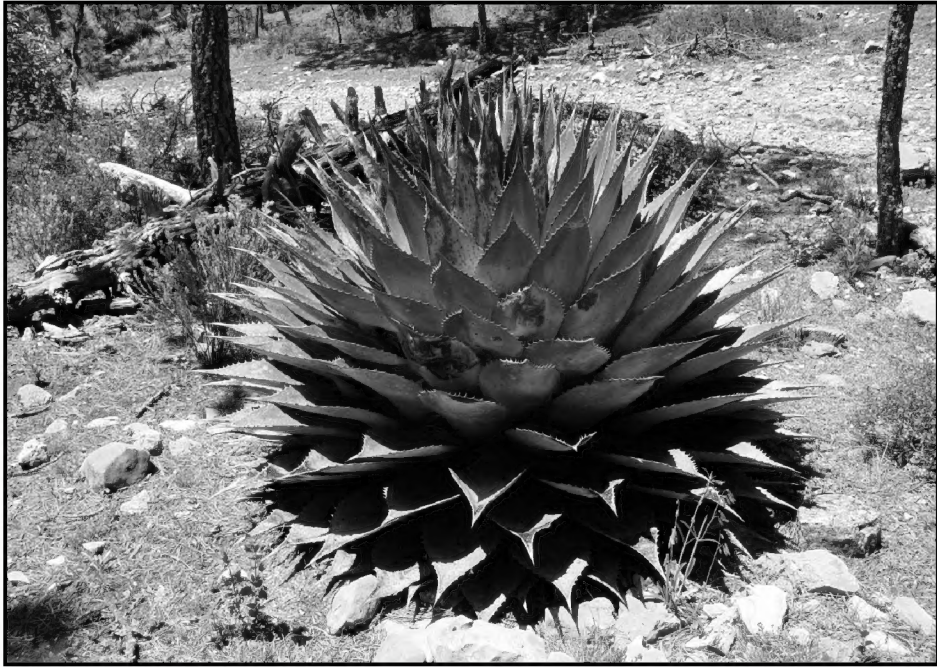
#### 4) Pablillo

This area is characterized by an irregular topography and





*Agave gentryi* at La Marcela, Miquihuana, Tamaulipas, Mexico.  
 Photograph by Jacinto Treviño-Carreón.



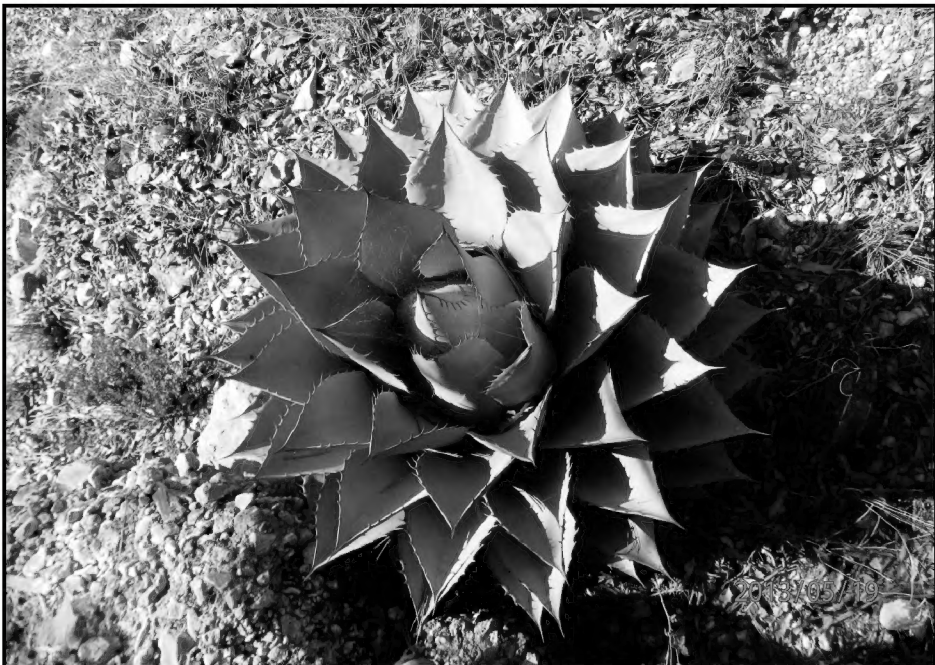
*Agave montana* at Puerto Cieneguillas, Galeana, Nuevo León, Mexico.  
 Photograph by David Lazcano.



*Agave bracteosa* at Sierra de Gomas, Bustamante, Nuevo León, Mexico.  
 Photograph by Manuel Nevárez de los Reyes.



*Agave celsii* at Puerto Cieneguillas, Galeana, Nuevo León, Mexico.  
 Photograph by Silvana Treviño-Pacheco.



*Agave ovatifolia* at Sierra de Gomas, Bustamante, Nuevo León, Mexico.  
 Photograph by Manuel Nevárez de los Reyes.



Two sympatric species, *Agave lechuguilla* and *Agave scabra* in Casa Blanca Canyon, Santa Catarina, Nuevo Leon, Mexico. Photograph by Manuel Nevárez de los Reyes.



elevations ranging from 2000 to 3000 masl, here we can observe pine and oak plant communities where *Quercus* spp. (Oaks / *encinos*) stand out, and we also see various species of pines such as *Pinus hartwegii* (Mexican mountain pine / *ocote blanco*), *P. cembroides* (Mexican pinyon pine / *pino piñoner*), *P. arizonica* (Arizona pine / *pino blanco*). In the higher elevations we find other important conifers such as *Abies vejarii* (fir / *oyamel*) and *Abies pseudotsuga* (fir / *oyamel*). These pine communities share habitat with *Agave lechuguilla*, *A. gentryi* and *A. montana*. Another plant community is characterized by *Juniperus deppeana* (checkerbark juniper / *táscate*), which is associated with forests of pine and oaks. The area is located about 126 km south from the center of the Monterrey Metropolitan Area, in the municipality of Galeana, Nuevo León, Mexico.

#### 5) Puerto Cieneguillas

This site is located about 15 km. from the town of Pablillo, Galeana, Nuevo León. Thanks to its altitude and the temperate climate, oak-pine and pine vegetation communities are common. The landscape is dominated by the oak *Quercus greggi* (Mexican oak / *encino Mexicano*), and by conifers such as *Pinus teocote* (Aztec pine / *ocote*), *P. arizonica* (Arizona pine / *pino blanco*), *P. cembroides* (Mexican piñon / *pino piñonero*). There is also a small extent of tropical montane cloud forest / cloud forest community with *Pinus teocote* (Aztec pine / *ocote*), *Quercus* spp. (oaks / *encinos*), *Cornus florida* (Cherokee princess / *sanguíñuelo florido*), and *Carya* sp. (hickory / *nogal Americano*). And we can also find a submontane scrub plant community, with species like *Painteria elachistophylla* (American ebony / *ebanillo*), *Acacia berlandieri* (Berlandier's acacia / *guajillo*), *Fraxinus greggii* (littleleaf ash / *escobilla*), and *Decatropis bicolor* (thumbnail / *aranto*). All of these plant communities are fragmented. The altitude gradient here is from 2225 to 2550 masl, and we found the following agaves: *Agave lechuguilla*, *A. montana* and *A. gentryi*. The area is about 132 km south from the center of the Monterrey Metropolitan Area.

#### 6) Sierra San Antonio Peña Nevada (SSAPN)

This area is in the southwestern portion of the state, part of the much larger mountainous area of the Sierra Madre Oriental, 30% of which lies within the municipality of Zaragoza in Nuevo León and 70% within the municipality of Miquihuana in Tamaulipas. This sierra encompasses a surface of 605 km<sup>2</sup>; its geographical coordinates are Latitude N 23°33'18" to 23°52'28" and Longitude W 99°38'55" to 99°56'45". Within the municipality of Zaragoza in Nuevo León, it occupies approximately 209.5 km<sup>2</sup> of sierras and canyons. It is now considered part of the National System of Priority Areas RTP-86 (Arriaga et al., 2000). We mainly visited a locality known as "La Siberia" and its surrounding areas. There is an altitude gradient from 2200 to 3450 masl, which favors the presence of different plant communities. There are extensive areas with *Arbutus xalapensis* (Texas madrone / *madroño*), *Pinus teocote* (Aztec pine / *ocote*), *P. hartwegii* (Hartweg's pine / *ocote blanco*), *P. arizonica* (Arizona pine / *pino blanco*). In the higher elevations the pine forests are associated with a beautiful fir forest of *Abies vejarii* (fir / *oyamel*). There are also extensive portions of *Quercus greggi* (Mexican oak / *encino Mexicano*).

In this mountainous site we can find the following major

plant communities/forests: *oyamel* (fir), pine, oak, mixed forest and chaparral. In these communities the agaves are mainly present in open-canopy forest, forming large aggregations of live and dead agaves. In the fir forest we can find the following agaves: *Agave gentryi*, *A. montana* and *A. striata*. In the pine forest *Agave celsii* (peña century plant / *maguey de peña*) and *A. lechuguilla*. In the oak forest *Agave celsii*, *A. lechuguilla*, *A. gentryi* and *A. striata*. In the mixed forest *Agave celsii*, *A. lechuguilla*, *A. gentryi*, *A. scabra* and *A. striata*. In the chaparral *Agave lechuguilla*, *A. scabra* and *A. striata*. This complex of sierras is located about 217 km southeast from the center of the Monterrey Metropolitan Area.

#### 7) La Marcela

Adjacent to the Sierra de San Antonio Peña Nevada, is the locality known as La Marcela, in the municipality of Miquihuana, Tamaulipas, with similar forest communities to SSAPN. However, the region is characterized for being a transition zone between the pine-oak forest and rosetophilous scrubland, here we find dominant plants species such as: *Quercus galeanensis* (Galeana oak / *encino de Galeana*), *Arbutus xalapensis* (Texas madrone / *madroño*), *Comarostaphylis polifolia* (bearberry / *madroño*), *Arctostaphylos pungens* (pointleaf / *frutilla*) and *Garrya* spp. (Silktassel / *chichicuahuatl*). We can find the following agave species, well adapted to both plant communities, in this area: *Agave lechuguilla*, *A. gentryi* and *A. montana*. There is an altitude gradient from 2200 to 3450 masl. The area is located about 226 km southeast from the center of the Monterrey Metropolitan Area.

### Methods

The study sites were sampled at different times from 1996 through to the present:

- 1) San Isidro Canyon: We have been working this site since 2002.
- 2) Casa Blanca Canyon: This site has received frequent visits since 2012.
- 3) Sierra de Gomas: We have studied this site since 2013; it is part of a research program for this protected area.
- 4) Pablillo: This site has received our attention in 1996–1997, 2002, 2006 and 2014.
- 5) Puerto Cieneguillas: This site also has received frequent visits since 1996, with trips during 2009, 2010 and 2014.
- 6) Sierra San Antonio Peña Nevada: We studied and explored this site during 2002–2004; extra time was invested here.
- 7) La Marcela: This site received our attention in 1996, 2004 and 2007.

At each study site we documented all sightings of herpetofauna conducting any type of activity in or on any agave species.

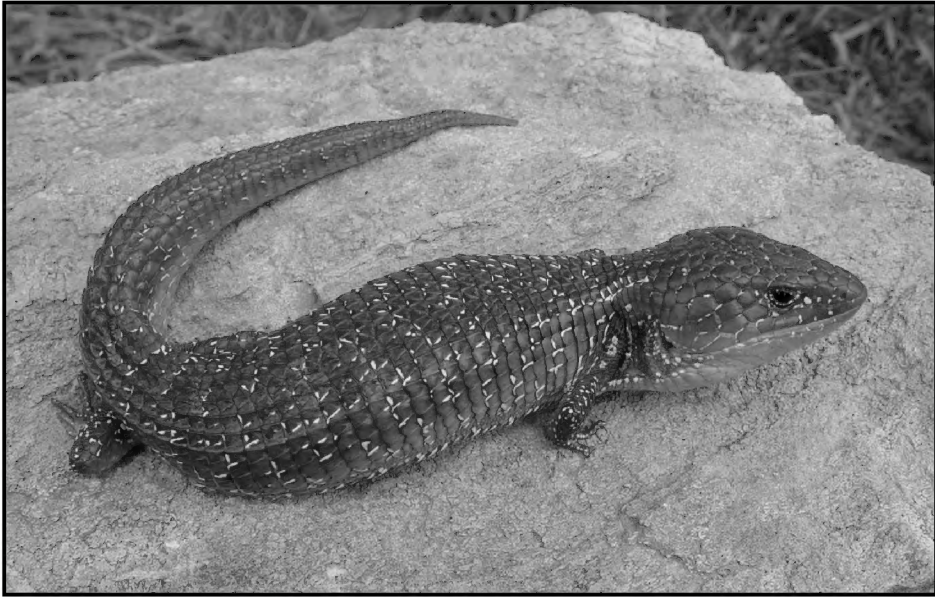
### Results

The results presented here document the distribution of herpetological activity in or on agave species at the different study sites. Three categories of behavior were recognized: 1) foraging; 2) thermoregulation/basking; 3) refuge.

#### San Isidro Canyon

We observed thermoregulating/basking on *Agave lechuguilla*





A *Barisia ciliaris* from Sierra San Peña Nevada, Zaragoza, Nuevo León, México. Photograph by Alan Kardon.



A regular inhabitant in agaves—*Pseudoeurycea galeanae* from Sierra San Peña Nevada, Zaragoza, Nuevo León, México. Photograph by Alan Kardon.



A *Thamnophis exsul* from Sierra San Antonio Peña Nevada, Zaragoza, Nuevo León, México. This individual found using an *Agave gentryi*-*Agave montana* aggregation as a refuge. Photograph by Alan Kardon.



A *Crotalus lepidus* under an *Agave lechuguilla*, using it as a refuge in Sierra de Gomas, Bustamante, México. Photograph by Manuel Nevárez de los Reyes.



A *Coleonyx brevis* very close to an aggregation of *Agave lechuguilla* which provides a refuge in Sierra Gomas, Bustamante, Nuevo Leon, México. Photograph by Manuel Nevárez de los Reyes.



An agave bat, *Leptonycteris nivalis*, visiting *Agave gentryi* in the area of La Marcela, Miquihuana, Tamaulipas. Photograph by Jacinto Treviño-Carreón.



by *Gerrhonotus infernalis* (neonates and juveniles), *Gerrhonotus parvus*, *Sceloporus couchii*, *Sceloporus oregon* (juveniles) and *Sceloporus parvus*. Depending on the size of the agave they could also be using it as a refuge site. In a branch canyon with abundant humidity and a pond of water we found *Eleutherodactylus cystignathoides campi* under agave leaves very close to the ground.

#### Casa Blanca Canyon

We observed *Coleonyx brevis*, *Plestiodon pineus* and *Salvador grahamiae lineata* using *Agave scabra* as a refuge.

#### Sierra de Gomas

We observed *Crotaphytus collaris* thermoregulating/basking on *Agave lechuguilla*. Another *Crotaphytus collaris* was using an *A. scabra* as a refuge site. We also found *Sceloporus p. poinsettii* and *Sceloporus merriami australis* thermoregulating/basking on *A. lechuguilla* and *A. victoria-reginae* that were growing out of the rock walls in the montane area. *Coleonyx brevis* and *Crotalus lepidus* were observed using *A. lechuguilla* as a refuge site.

#### Pablillo

We observed *Sceloporus grammicus disparilis* and *Crotalus morulus* thermoregulating/basking on agaves in an *Agave gentryi-A. montana* aggregation. The same agaves were used as refuges by *Plestiodon pineus* and *Crotalus molossus nigrescens*.

#### Puerto Cieneguillas

The only species observed thermoregulating/basking were *Sceloporus grammicus disparilis* and *Crotalus morulus* in *Agave gentryi-A. montana* aggregations. As refuge sites we found *Sceloporus grammicus disparilis*, *Plestiodon pineus*, *Crotalus molossus nigrescens*, *Crotalus morulus* and *Crotalus pricei miquihuanus* using these same aggregations of agaves. In this locality it is common to find large associations of all the agave species.

#### Sierra San Antonio Peña Nevada

Since more time and effort were expended at this study site there is a larger list of species. The following species were observed foraging and thermoregulating/basking on *Agave gentryi-A. montana* aggregations: *Sceloporus chaneysi*, *Sceloporus grammicus disparilis*, *Sceloporus minor*, *Sceloporus torquatus mikeprestoni*, *Plestiodon pineus*; a single *Sceloporus parvus* was found thermoregulating on an *Agave lechuguilla*. Using the agave aggregations for refuge we observed *Chiropterotriton priscus*, *Pseudoeurycea galeanae*, *Ollotis nebulifer*, *Salvadora grahamiae lineata*, *Storeria hidalgoensis*, *Thamnophis exsul*, *Thamnophis pulchrilatus* and *Crotalus molossus nigrescens*. *Crotalus morulus* and *Crotalus pricei miquihuanus* were seen using this site for foraging, thermoregulating/basking and refuge. Finally *Barisia ciliaris* was observed using the *Agave gentryi-A. montana* aggregation for foraging and refuge.

#### La Marcela

The only herpetological species that were observed using agaves for foraging, thermoregulation/basking and refuge were *Sceloporus grammicus disparilis* and *Crotalus morulus* on *Agave gentryi-A. montana* aggregations. We were fortunate to see a rarely observed behavior: 2 females of *Crotalus morulus* with 10 babies lying on their backs—all were thermoregulating/

basking on leaves of *A. montana*. The only species observed using an *Agave gentryi-A. montana* aggregation as a simple refuge site was *Plestiodon pineus*.

## Discussion and Conclusion

Information on the use of specific species of agaves by herpetofauna has poorly been documented; many articles mention the herpetofauna active in a plant community which might include a few species of agaves, but do not specify the species of agave. A few herpetologists have documented this behavior. Webb (1965) in describing *Xantusia extorris* (Durango night lizard / *lagartija nocturna de Durango*) from eastern Durango, mentions that the habitat where they were found was a typical Chihuahuan Desert community with abundant yuccas, *Agave lechuguilla* and a few other small agaves which were just identified at first as *Agave* sp., later identified as *Agave scabra*. The yuccas and these small agaves were related to the presence of *Xantusia extorris*, but Webb doesn't mention any other associated species.

Other reports document finding *Sceloporus consobrinus* (prairie lizard / *lagarrijas de las cercas*; as *Sceloporus undulatus consobrinus*) most frequently in *Agave asperrima* (rough agave / *maguey cenizo*), that was associated with nests of *Neotoma albigula* (agave rat / *rata magueyera*) in the Bolson de Mapimí on the Mexican Plateau (Gadsden-Esparza and Aguirre-León, 1993; Gadsden-Esparza and Palacios-Orona, 1995). Liner and Dixon (1992, 1994) described and documented a new species of lizard, *Sceloporus chaneysi* (Chaney's bunchgrass lizard / *espinosa de Chaney*) endemic to Sierra San Antonio Peña Nevada and surrounding areas in Nuevo León and Tamaulipas. Specific agave species frequented by these lizards have since been documented (Lazcano-Villareal and Contreras-Arquieta, 1995; Lazcano et al., 2004; Lazcano, 2005; Lazcano-Villareal and Pacheco-Treviño, 2015). Books dedicated to the herpetofauna of the neighboring states of Chihuahua, Coahuila, Nuevo León, San Luis Potosí and Hidalgo (Lemos-Espinal and Smith, 2007a; Lemos-Espinal and Smith, 2007b; Lazcano-Villareal et al., 2010; Lemos-Espinal and Dixon, 2013; Ramirez-Bautista et al., 2014) only mention that some herpetofauna species inhabit different vegetation communities where agaves are present, but do not specify any particular species. Lozano-de la Rosa (2004) discusses plethodontids and the use of agaves, but doesn't indicate what agave species were being used as refuges.

Based on the frequent association of *Crotalus morulus* with agaves in numerous sites where oak-pine forest are sympatric with certain agave species, this snake should be given the common name of Tamaulipan agave rock rattlesnake (Price, 2014). Castillo-Hernandez and Trevino-Carreón (2009) document the flowering of *Agave gentryi* in the state of Tamaulipas where there is an ancient symbiosis between this species and many vertebrates and invertebrates, especially with bats. This agave species is also present in Puerto Cieneguillas, and Sierra San Antonio Peña Nevada, forming large aggregations with *A. montana*.

Depending on the species agaves can provide numerous sites for foraging, thermoregulation/basking and refuge, and their leaves may also provide a humid environment in times of drought.



**Table 1.** The former Agavaceae family in the new taxonomic classification is now considered the subfamily Agavoideae within the Asparagaceae family.

| Study sites                                                                       | <i>Agave</i> species           | Altitude gradient (masl) | Taxonomic synonyms       | Protection status | Sympatric with                    |
|-----------------------------------------------------------------------------------|--------------------------------|--------------------------|--------------------------|-------------------|-----------------------------------|
| Casa Blanca Canyon (1,100–2,500 masl)<br>Santa Catarina, Nuevo León, Mexico       | <i>Agave bracteosa</i>         | 900–1700                 |                          | Threatened        |                                   |
|                                                                                   | <i>Agave lechugilla</i>        | 950–2300                 |                          |                   |                                   |
|                                                                                   | <i>Agave montana</i>           | 2300–2700                | <i>Agave macroculmis</i> |                   |                                   |
|                                                                                   | <i>Agave scabra</i>            | 1200–2200                | <i>Agave asperrima</i>   |                   | <i>Agave lechuguilla</i>          |
|                                                                                   | <i>Agave striata</i>           | 700–2500                 |                          |                   |                                   |
| San Isidro Canyon (1,540–2,300 masl)<br>Santiago, Nuevo León, Mexico              | <i>Agave americana</i>         | 500–1300                 |                          |                   |                                   |
|                                                                                   | <i>Agave bracteosa</i>         | 900–1700                 |                          | Threatened        |                                   |
|                                                                                   | <i>Agave lechugilla</i>        | 950–2300                 |                          |                   | <i>Agave scabra</i>               |
|                                                                                   | <i>Agave scabra</i>            | 1200–2200                | <i>Agave asperrima</i>   |                   | <i>Agave lechuguilla</i>          |
|                                                                                   | <i>Agave striata</i>           | 700–2500                 |                          |                   |                                   |
| Sierra de Gomas (500–2,500 masl)<br>Bustamante, Nuevo León, Mexico                | <i>Agave americana</i>         | 500–1300                 |                          |                   |                                   |
|                                                                                   | <i>Agave bracteosa</i>         | 900–1700                 |                          | Threatened        |                                   |
|                                                                                   | <i>Agave lechugilla</i>        | 950–2300                 |                          |                   | <i>Agave scabra</i>               |
|                                                                                   | <i>Agave ovatifolia</i>        |                          | <i>Agave noah</i>        |                   |                                   |
|                                                                                   | <i>Agave scabra</i>            | 1200–2200                | <i>Agave asperrima</i>   |                   | <i>Agave lechuguilla</i>          |
|                                                                                   | <i>Agave striata</i>           | 700–2500                 |                          |                   | These two species are sympatric   |
|                                                                                   | <i>Agave victoriae-reginae</i> | 700–1600                 |                          | Endangered        |                                   |
| Pablillo (2,000–3,000 masl)<br>Galeana, Nuevo León, Mexico                        | <i>Agave gentryi</i>           | 2000–2500                | <i>Agave macroculmis</i> |                   | <i>Agave montana</i>              |
|                                                                                   | <i>Agave lechuguilla</i>       | 950–2300                 |                          |                   |                                   |
|                                                                                   | <i>Agave montana</i>           | 2300–2700                | <i>Agave macroculmis</i> |                   | <i>Agave gentryi</i>              |
| Puerto Cieneguillas (2,225–2,550 masl)<br>Galeana, Nuevo León, Mexico             | <i>Agave celsii</i>            | 900–2200                 |                          |                   |                                   |
|                                                                                   | <i>Agave gentryi</i>           | 2000–2500                | <i>Agave macroculmis</i> |                   | <i>Agave montana</i>              |
|                                                                                   | <i>Agave lechugilla</i>        | 950–2300                 |                          |                   |                                   |
|                                                                                   | <i>Agave montana</i>           | 2300–2700                | <i>Agave macroculmis</i> |                   | <i>Agave gentryi</i>              |
| Sierra San Antonio Peña Nevada (2,200–3,450 masl)<br>Zaragoza, Nuevo León, Mexico | <i>Agave celsii</i>            | 900–2200                 |                          |                   | <i>Agave montana</i>              |
|                                                                                   | <i>Agave gentryi</i>           | 2000–2500                | <i>Agave macroculmis</i> |                   | <i>Agave montana</i>              |
|                                                                                   | <i>Agave lechugilla</i>        | 950–2300                 |                          |                   |                                   |
|                                                                                   | <i>Agave montana</i>           | 2300–2700                | <i>Agave macroculmis</i> |                   | <i>Agave gentryi</i>              |
|                                                                                   | <i>Agave scabra</i>            | 1200–2200                | <i>Agave asperrima</i>   |                   | <i>Agave lechuguilla</i>          |
|                                                                                   | <i>Agave striata</i>           | 700–2500                 |                          |                   | <i>Agave lechuguilla</i>          |
| La Marcela (2,200–3,450 masl)<br>Miquihuana, Tamaulipas, Mexico                   | <i>Agave gentryi</i>           | 2000–2500                | <i>Agave macroculmis</i> |                   | These three species are sympatric |
|                                                                                   | <i>Agave lechuguilla</i>       | 950–2300                 |                          |                   |                                   |
|                                                                                   | <i>Agave montana</i>           | 2300–2700                | <i>Agave macroculmis</i> |                   |                                   |

Note: Other agave species may be found in these study sites, but they are not documented here because we found no herpetological activity on them.



One important note is that when *Agave gentryi* and *A. montana* aggregate, this happens within an attitude gradient, normally 2,300–2,500 masl; below and above this altitude range we see the individual species. When species form such aggregations there must be some type of hybridization going on (Pacheco-Treviño, 2014). Below 2,300 masl we only see *Agave gentryi*, and above 2,700 masl only *A. montana* is present. Maybe this difference in attitude preference between the two agave species has an impact on the distribution of the herpetofauna.

## A Reflection

The diversity of the agaves, and their particular characteristics that were important for pre-Hispanic civilizations and remain so today, have been documented. It is important to review with extra detail the extraordinary ecological service provided by agaves to a wide variety of vertebrates and invertebrates. It is vital to safeguard the genetic phytodiversity all wild and cultivated agave species in Mexico. Conservation practices must be applied and diseases that are emerging in this group must be studied. We should worry deeply and not take it lightly. Failing to recognize and understand the millennia-old relationships of agave-resident species would be careless of us and could lead to tremendous negative consequences.

In 1998 forest fires were rampant throughout Mexico, including Nuevo León. At “Cerro de Potosí” in the municipality of Galeana, Nuevo León, an intensive fire was so robust that it jumped via the strong air currents to a nearby hill known as

“Cerro de la Viborillas.” When we inspected the area a few weeks later, it seemed as if the mixed pine-oak forest had been devastated by a nuclear explosion; the only visible survivors were the agaves. This area in particular had a flourishing, dynamic herpetofaunal community. The environmental services provided by the agaves were essential for all plant/forest community succession. Today these forests recover slowly, and agaves continue to grow steadily.

Agaves are always more abundant in gaps in the canopy of forests, but even in denser forests agaves are well adapted to receiving lesser amount of light; they provide an important ecological service, reducing soil erosion almost to zero, and maintaining humidity and a constant production of humus.

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## For the Love of Horny Toads

Roger A. Repp

Our beloved Editor has honored this Arizona herper greatly by offering to publish a monthly column. I was told that whatever is pecked out by the tentacles of articulating flesh that extend outward from my hands, he will publish. The last editor to issue such an offer as this now refuses to get out of his chair, drools excessively, and has lost all interest in everything herpetological in nature. Our poor Editor does not realize what he is in for. Nor do the readers—both of you!

By way of introduction, this author was born in 1954, and spent his formative years in the northern suburbs of Chicago. Part of those formative years involved the Chicago Herpetological Society. I began attending the meetings and joined at the tender age of 13, roughly 47 years ago. While I was already well on my way to the hopeless geekdom associated with the love of all things reptilian, it was through the CHS that this interest exploded into an all out passion. Said passion eventually led me away from my place of birth. In 1978, I relocated to Florida, spent a couple years messing with cottonmouths and alligators, and then moved on to the state of Washington. While in Washington, I acquired an extreme hatred of cold, rainy weather, and began to make plans to move back to Florida. These plans were thwarted by my beloved wife Dianna, who was ready for *anything* but Florida. She began buying issues of *Arizona Highways* magazine, and placing them in strategic locations—such as draped over my face while I was sleeping. When I woke up, I'd be looking at such places as Monument Valley, the Grand Canyon, or saguaro cactus studded landscapes. Dianna also brought an accomplice into her little scheme. Said accomplice was my best friend during the "Illinois Native" part of my life.

Mike was with me the first time that I ever saw a Sonoran Mountain Kingsnake. Said kingsnake was viewed sprawled lengthwise in a 20-gallon aquarium at a Noah's Ark Pet Center in Schaumburg, Illinois. Mike witnessed my reaction to the stunning three-foot-long serpent, which was encircled with the red, white and black coloration indicative of this jewel of the Southwest. Mike had to forcibly remove me from the premises, as he saw me pulling a sock off my right foot. He knew the behavioral patterns associated with his best buddy enough to know that my intent was to lift the lid off that aquarium and stuff three feet of Sonoran Mountain Kingsnake into that sock. Petty theft was not my usual mode of operation, but I wanted that snake! And at two hundred ninety-nine dollars and ninety-nine cents, there was no way in hell that I could ever afford to buy it.

My buddy Mike kept me out of trouble a lot back in those days, and thanks to Dianna, he kept me out of trouble again. Between the time I was about to rip off Noah's Ark, and my purgatory in Washington, Mike had relocated to Phoenix, Arizona. At Dianna's urging, Mike purchased a little 99-cent booklet entitled *Snakes of Arizona*. Along with a letter encouraging me to move to Arizona, he packed that little booklet, and mailed it to me. His letter had all the effect of passing gas in a hurricane. But as I flipped through that booklet, I beheld a Sonoran Mountain Kingsnake. Alongside the black-and-white ink draw-

ing of this snake, Mike's untidy scrawl appeared. He wrote: "Worth how much?"

Sold! Hook, line, and sinker—off went the Repp family to Arizona, while operating under the motto of Tucson or rust!

As this first column for the CHS is written, 34 years after moving to Tucson, it may seem odd to the reader that I don't feel compelled to immediately regale you with the obvious virtues of herping in Arizona. Why shoot, we have so many species of rattlesnakes that we don't even know how many species of rattlesnake that we have! And do you want to talk about lizards? If all we had here was Gila Monsters, that would be enough to wow anybody of a herpetological bent. But we have one helluva lot more than Gila Monsters going down here.

We promise that in the future, we will speak of the Arizona experiences. For this first column, I want to bring it all back home. Sweet home Chicago! I do still love the place. I still love the people. I love the way you all think, and especially, the way you all talk. I've done my best to retain my Chicago accent, (or should I say—lack of accent?), through the years. I firmly believe that we speak the English language the way it was intended to be spoken. I love the friendships that I made and retained, the opportunity and skills that I learned there from patient mentors, duh Bears, the Cubs, the Sox, the Bulls, and the Blackhawks (Go Hawks!). Is Chicago "my kind of town?" You bet! You should all be rightly proud to live there.

And so, we're now officially starting the first monthly column for the CHS. And we're starting it with one word. And that word is: "Urns."

Yup! We're going to talk about urns for a minute. Those of us who remember JFK's assassination, the first moon walk, the advent of the birth control pill, and the invention of Baggies might know about urns. Especially those of us who spent our formative years in the nation's heartland.

While urns come in all shapes and sizes, we are speaking about a specific type. We're not talking about the cheesy, made-in-China urns of today. The urns we speak of are best described as "manly urns." Back in the day, in America's heartland, every town had an ordinance that clearly stated "Each and every yard in our fair city will have a minimum of two manly urns prominently displayed."

In order for an urn to achieve the status of manly urn, it had to be a minimum of 18 inches in diameter at the base. It then must flare outward to a minimum of 36 inches in diameter at about 30 inches high, and then neck inward, with an upper lip that would roll outward to 18 inches in diameter again. The inner walls of a manly urn would be a minimum of one-inch thick, and be made from the finest terra cotta clay. The exterior of the urn would next be fired and glazed, so that the outer wall was case-hardened and nearly impenetrable.

That's what we're calling a manly urn.

People planted petunias in their manly urns, which is a



classic example of under-utilization. Put one manly urn under each corner of Fort Knox, and they would support it indefinitely. But their only use seemed to be to hold dainty little flowers.

In our day, a nuclear holocaust was a distinct possibility. Even back then, we as a nation didn't play well with others. Had the buttons been pushed, as they very nearly were, America's heartland would have been smoked like a freshly rolled hooter. And while all of suburbia might have been reduced to radioactive ash, there would have remained two manly urns per every quarter-acre patch of ground. Such was the quality and durability of the manly urns in our day.

We would not speak of such urns as these were there not a herpetological purpose behind these words. While you all could benefit from knowledge of this subject, the construction of manly urns is not the real theme of this missive.

In my neighborhood, nearly everybody had a pet horned lizard. I was no exception. You'd just go to the local pet store, and buy one for a buck. When that one died, you grieved for about 30 seconds, and then just went and bought another one. The local pet stores seemed to have an endless supply of them.

When I was in the fourth grade, my family traveled to Washington State. The idea of taking the current horned lizard in my possession with us was abruptly nixed. Hence, I had to find somebody to care for it.

I selected my friend Jim as the lucky caregiver for my lizard. Jim was a good guy, he liked animals, and he should have been a good choice. But the events that played out during my absence made it nothing but a lose-lose proposition for both lizard and caregiver alike.

We must highlight the fact again that we are speaking of fourth graders. A few years previous to our entering this lofty position in life, we are wishing for our two front teeth. And then, when we get them, they are usually too large for us. We eventually grow into our two front teeth, so to speak. With Jim, his not only came in large, they came in angled sharply outward. Hence, he could have easily devoured an ear of corn through a picket fence. By lowering his head slightly, he could plow parallel furrows in fields with those rascals. In other words, he had ENORMOUS buck teeth.

And so, we got urns, we got a horned lizard, and we got a kid with enormous buck teeth. Yup! This has all the makings of a Roger Repp column for sure!

Just after my family left for Washington, Jim decided to let my pet horned lizard, named "Bill" (I named them all Bill, regardless of gender), loose in his front yard. While Bill was frolicking about in the front yard, Jim took it upon himself to do some watering chores. So engrossed was Jim with the garden hose that he clean forgot about Bill. Had he continued to cleanly forget about Bill, the story would have ended here without ever being told.

But no, no, Jim had to suddenly remember that he was babysitting a horned lizard. He looked up from his watering chores to see Bill waddling at full speed around the corner of his house.

Jim tossed the hose down, and began a short-lived wind sprint in the direction of the wayward Bill. About the time that Jim managed to gain a full head of steam, his left foot hooked into his right, and his wind sprint morphed into a rumbling, stumbling fall.

It is hard imagine what assails the visual senses when a manly urn is suddenly coming at one's face at about 20 miles per hour. It has to be a very stimulating sight! Only Jim could tell us for sure—and his whereabouts now are unknown.

One thing is for certain—the view was brief. A split-second before he saw stars, he opened his mouth to scream. As he did, those immense buckers of his swung outward, becoming the most prominent feature on his visage. These same teeth slammed into the manly urn at terminal velocity, and both teeth then proceeded to snap off at mid-point between the edge and gum line. His nose was next to connect, with the rest of his face following shortly thereafter. OUCH!

The first indication that I had of the trouble came when I went to retrieve Bill a couple weeks later. By this time, Jim was out of the hospital, and well enough to go outside again. I found him in his front yard, and noted his facial bruising. Even at this tender age, the people skills, tact, and diplomacy that have become my personal trademark were developing. Hence, my first utterance was:

"JEEZ JIM! What did you do—try to stop a train with your face?"

At this announcement, Jim's battered countenance clouded up. His upper lip curled into a sneer. As it did, an identical pair of silver light beams blazed into my eyes.

"Yeow!" Says I, "You wanna turn those flamethrowers off? They're hurting my eyes!"

Dental procedures in those days were still in their infancy. The cure for two broken front teeth was to stick silver crowns over top. The teeth that were once merely enormous, were even MORE enormous, and gleaming with a mirror-like shine. For the next several years, Jim was no longer known as Jim to us. He became "Flash McCrash."

From that day forth, if we ever wondered where Flash was in our neighborhood, we would just look for a pair of silver, glinting lights. (It would be handy to have such a pair of whoppers for shining rock crevices and holes here in Arizona. No need to carry a mirror. Just crack a toothy smile, and cock your head to catch the sun just right.)

As for Bill, well, we can hope that his last summer as a free man again was a pleasant one. He had at least one good thing going for him. He was a Texas Horned Lizard who knocked a Yankee's teeth out. The South had risen again!

The Flash McCrash Urn was to become a famous landmark in our neighborhood. Every kid admired, multiple times, the impact of "ground zero" on the flank. My last visit to the glorious Flash McCrash Urn occurred about ten years ago. At that time, the Urn was still in its moorings, as were the two indentations that were punched there over 40 years previous.



While we should let the story end here, and be amused by it all, there is a very sad truth contained within the framework. We speak of the easy access we had to Texas Horned Lizards (*Phrynosoma cornutum*) in the early 1960s. For a buck, we got a very cool looking, albeit difficult to keep lizard. Along with our horny toads, we were sold little clear plastic containers, and encouraged to buy meal worms to feed them. Despite the many horny toads that I kept, I never even once saw one eat a meal worm. However many I kept, and I pray there were fewer than I think, they all eventually slowly starved to death.

To somebody who is nine years old, their perception of the world is that of their neighborhood and school. At the time, that was my only world. Other places simply did not exist. As I look at the town of Crystal Lake, Illinois, through the eyes of an adult, I see a very tiny corner of the world. And in this tiny corner of the world, countless horny toads met their demise. How many other places were swept along by the fad of easily available, very cool looking lizards? Countless! Perhaps some of the readers of this column remember their turn with horny toads.

There is an organization centered in Austin, Texas, called the Horned Lizard Conservation Society. It was formed by scientists and lay people alike in the early 1990s. In Texas, nearly everybody loves horny toads—especially those who were raised in the era under discussion. They all tell stories from their childhoods of finding them by the score. They dressed them up in little doll clothes, hitched up entire teams of them to pull miniature stage-coaches, or carried them around in their shirt pockets. And now, the horny toads are gone from many places where they used to be common. They lament their loss.

It was my pleasure to present to the Horned Lizard Conservation Society on several occasions. With one of these presentations, I began by telling them my story of what happened with the horny toads in Illinois. When I got the part where I told them we were buying them for a buck apiece in Illinois, a voice boomed out from the back of the room.

“I was probably the one who sold them to you.”

The man stood up, he was an affable fellow who was about the same age as me. He went on to tell his story. He was raised on the outskirts of Austin, Texas. The word got out that a dealer was paying kids a quarter apiece for every horny toad they could collect. According to his story, nearly every kid in town was involved. For over a year, they swooped down on the hapless lizards, until it got to the point where there was not a single individual to be found. At this point in the story, he choked, and sat back down. He was not the only one to choke. These Texans loved their horny toads, and now they’re gone, and they still feel the pain and guilt 50 years later.

This author often hears the phrase “it would be impossible to collect an area out.” This statement is usually made by those who can’t leave a herp on the ground. The horny toad folk in Texas would strongly disagree with such a statement. And this Illinois boy also knows better. I can only imagine what would have happened if a dealer offered the kids in my home town a quarter apiece for Leopard Frogs. It would have been a slaughter. I’m glad that it didn’t happen!

This here is Roger Repp, signing off from Southern Arizona, where the turtles are strong, the snakes are handsome, and the lizards are all above average.



## Herpetology 2015

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

### PINESNAKE HOME RANGES AND DISPERSAL

R. Zappalorti et al. [2015, *Herpetologica* 71(1):26-36] studied home range size and maximum dispersal distance from hibernacula in northern pinesnakes (*Pituophis m. melanoleucus*) at a 1418-ha preserve in Cumberland County, New Jersey, between 1993 and 2003. They discovered 22 different winter hibernacula that were used by 39 northern pinesnakes. Of the 10 snakes monitored in hibernacula for 3–5 yr, shifting was observed by 8 individuals, and 2 females showed hibernaculum philopatry for five consecutive years. The average minimum convex polygon home range of 14 radio-tracked northern pinesnakes was 105.51 ha (located 30–108 times/snake). There were no differences in home range as a function of sex, but the number of years snakes were radio-tracked affected home range size. An adult male had the largest home range of 258 ha. The average distance traveled by radio-tracked northern pinesnakes from their winter hibernacula was 1321.05 m, with a maximum distance of 2146.91 m. Of all snakes followed, 27.3% (n = 3) traveled <1000 m, 18.2% (n = 2) traveled 1000–1100 m, 18.2% (n = 2) traveled 1100–1200 m, and 36.4% (n = 4) traveled >1200 m. The average number of hibernacula available per home range was 3.2. Snakes that were monitored for 2 yr had larger home ranges than snakes that were only radio-tracked for 1 yr. Thus, radio-tracking several adult snakes over a 3–5-yr period is the most effective method to determine home ranges, locate hibernacula sites of meta-populations, and reveal an understanding of their ecology, behavior, and conservation requirements.

### DIET OF RIDGE-NOSED RATTLESNAKES

E. Mociño-Deloya et al. [2015, *J. Herpetology* 49(1):104-107] examined the diet of New Mexico ridge-nosed rattlesnakes (*Crotalus willardi obscurus*) from the Sierra San Luis and the Sierra Pan Duro in the northern Sierra Madre Occidental, México. All snakes included in this study were encountered during August, September, and October in 2003 and 2004. Including recaptures of previously captured individuals, 107 of 199 snakes contained at least one prey item. The authors examined 103 prey items from 92 of these snakes; some snakes contained multiple prey items. Approximately two-thirds of prey items were ectotherms (54.4% lizards and 13.6% scolopendromorph centipedes); birds (21.4%) and mammals (10.7%) were also taken. The diet of juvenile snakes (n = 32) consisted primarily of lizards (62.5%) and centipedes (25.8%), although large juveniles also consumed mammals (6.3%) and passerine birds (6.3%). Adult snakes (n = 71) fed primarily on lizards (50.7%) and passerine birds (28.2%) but also consumed mammals (12.7%) and centipedes (8.4%). *Crotalus willardi* in the Sierra San Luis and Sierra Pan Duro consumed more birds than has been reported from *C. willardi* in nearby populations and continued to consume centipedes as adults.

### FROG OR FRUIT?

D. J. Paluh et al. [2015, *Copeia* 2015(1):58-63] note that clay model experiments are commonly used to measure natural rates of predation and have become an important method in studying predator avoidance of aposematic frogs. Previous clay model experiments have demonstrated that conspicuous coloration in dendrobatid frogs is an effective deterrent to avian predators. It is generally assumed that predators recognize clay models as frogs, but few studies have examined this hypothesis. Certain aposematic frogs are similar in color to fruits on the forest floor, and it is possible that frugivorous or omnivorous birds perceive clay models as fruit. The present study further investigates aposematism in *Oophaga pumilio* and specifically examines the importance of model shape and color. Natural avian predation rates were assessed using clay models, which were either red or brown in color, and frog or ball (fruit) shaped. Overall, avian predation was significantly higher on red ball-shaped models when compared to red frog-shaped models. Brown frogs were also more likely to be preyed upon than red frogs. The omnivorous great tinamou (*Tinamus major*), however, exhibited no preference for frog color. Feeding naturally on fruits and seeds, tinamous in this study preferred and attacked red ball models more frequently, suggesting that they recognized these models as fruits. Collectively, the results provide evidence that birds distinguish between shapes and colors when making decisions about predation and that these attacks are dependent on the dietary preference of the predator. Clay model studies should take into account both color and shape of models, and consider that predation rates are likely dependent on the species assemblages present at a location and their specific dietary preferences.

### SEASONAL MIGRATIONS OF RED-BACKED SALAMANDERS

L. L. Woolbright and C. P. Martin [2014, *J. Herpetology* 48(4): 546-551] report direct observation of seasonal movements of adult *Plethodon cinereus* uphill to a rocky hilltop in the fall and downhill into a wet area in the spring. Counts from arrays of cover boards in both areas showed occupancy patterns that were consistent with seasonal changes in spatial distribution. Soil moisture was markedly higher and pH was slightly lower in the downhill area. Soil temperature did not differ between the two areas. Young age classes do not migrate but apparently stay in the wet area where they hatch. Differences in body size and egg diameter between fall and spring samples suggest that migratory adult salamanders grow and yolk eggs during the winter. The most likely explanation for this behavior is that the rocky hillside provides crevices that allow salamanders to get far enough underground to remain active in winter.



## Unofficial Minutes of the CHS Board Meeting, May 15, 2015

President John Archer called the meeting to order at 7:32 P.M.  
Board members Ed Huether and Aaron LaForge were absent.

### Officers' Reports

Treasurer: Mike Dloogatch presented the financial report. .

Sergeant-at-arms: Dick Buchholz informed the board that there were 27 people at the April meeting.

### Committee Reports

Shows:

- Notebaert Nature Museum, first full weekend of each month.
- Turtle Day at Cosley Zoo, Wheaton, May 23, 9 A.M.–1 P.M.
- Raging Waves Waterpark, Yorkville, June 20.
- Rockin' for Reptiles at Midwest Museum of Natural History, Sycamore, June 27, 11 A.M.–3 P.M.
- Sheffield Garden Walk, Lincoln Park, July 18–19.
- Green Fair on the Fox, Batavia, August 8, 9 A.M.
- Bug Fest at Red Oak Nature Center, Batavia, August 22, 9 A.M.–2 P.M.

Volunteers who work full shows can get reimbursed up to \$10 for lunches bought at the show. Dick will be in charge of reimbursement through a petty cash system.

Junior herpers: There were 35 people in attendance for the May Jr. Herpers meeting. The topic was responsible keeping. The speaker had his kids do most of the presenting. Rich would like to see older members get involved to help educate the younger kids. In June Bailey Cook will be speaking about “leachie” geckos.

### New Business

John Archer appointed Mike Dloogatch to fill the vacant membership secretary position. The board members present unanimously approved the appointment. John then appointed Andy Malawy to fill the treasurer position, also approved unanimously

The meeting adjourned at 8:39 P.M.

*Respectfully submitted by Rachel Fessler*

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### IN MEMORIAM: BUD WAGNER

Bud Wagner, locally loved naturalist, passed away May 21, 2015. Bud was a recognized bird expert whose knowledge included sport fishing and the world of reptiles. He was a retired master carpenter and had been a naturalist all his life with a talent for taxidermy and a great natural talent as an artist. For several years he volunteered at the CHS ReptileFest and at the Lake Forest Wildlife Discovery Center's Reptile Rampage as a temporary tattoo artist, raising money for these organizations. He will be missed by many.



## Advertisements

For sale: **highest quality frozen rodents.** I have been raising rodents for over 30 years and can supply you with the highest quality mice available in the U.S. These are always exceptionally clean and healthy with no urine odor or mixed in bedding. I feed these to my own reptile collection exclusively and so make sure they are the best available. All rodents are produced from my personal breeding colony and are fed exceptional high protein, low fat rodent diets; no dog food is ever used. Additionally, all mice are flash frozen and are separate in the bag, not frozen together. I also have ultra low shipping prices to most areas of the U.S. and can beat others shipping prices considerably. I specialize in the smaller mice sizes and currently have the following four sizes available: Small pink mice (1 day old—1 gm) , \$25 /100; Large pink mice (4 to 5 days old—2 to 3 gm), \$27.50 /100; Small fuzzy mice (7 to 8 days old—5 to 6 gm) , \$30/100; Large fuzzy mice /hoppers (10 to 12 days old—8 to 10 gm), \$35/100 Contact Kelly Haller at 785-234-3358 or by e-mail at [kelhal56@hotmail.com](mailto:kelhal56@hotmail.com)

For sale: Standard 24" Neodesha reptile cages, 3 × 6" vent on top, tempered glass front. Like new condition, no burns or stains, original glass. These cages do not have the dam (horizontal molding that crosses the entire front width of the cage, used to hold back bedding material)—easier to clean without the dam. About 20 currently available, \$45 each. Linda Malawy, (630) 717-9955, [linda\\_malawy@hotmail.com](mailto:linda_malawy@hotmail.com).

For sale: High quality, all locally captive-hatched tortoises, all bred and hatched here in the upper Midwest. Baby leopards, Sri Lankan stars, and pancakes usually available, and are all well-started and feeding great! Leopards are \$125 ea., Sri Lankans (2012 hatched) \$475 ea. And Pancakes are \$195 ea. Leopards for out of state sale/shipping require a veterinary health certificate (inquire for cost). E-mail at [KKranz1@wi.rr.com](mailto:KKranz1@wi.rr.com) or call Jim or Kirsten at 262 654 6303.

Herp tours: **Costa Rica herping adventures.** Join a small group of fellow herpers for 7 herp-filled days. We find all types of herps, mammals, birds and insects, but our target is snakes. We average 52 per trip, and this is our 10th year doing it. If you would like to enjoy finding herps in the wild and sleep in a bed at night with air-conditioning, hot water and only unpack your suitcase once, instead of daily, then this is the place to do it. Go to our web-site <http://hiss-n-things.com> and read the highlights of our trips. Read the statistics of each trip and visit the link showing photos of the 40 different species we have found along the way. E-mail at [jim.kavney@gmail.com](mailto:jim.kavney@gmail.com) or call Jim Kavney, 305-664-2881.

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## UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, June 24, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. This will be our popular and always well-attended annual **Show & Tell** meeting. Bring an animal that you find interesting for one reason or another and be prepared to give a short (under five minutes) presentation to the group. Don't be shy. Neither age (yours) nor commonness (the animal's) should be a limitation.

At the July 29 meeting, **Phil Goss**, president of USARK and owner of Goss Reptiles, will be the featured speaker.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

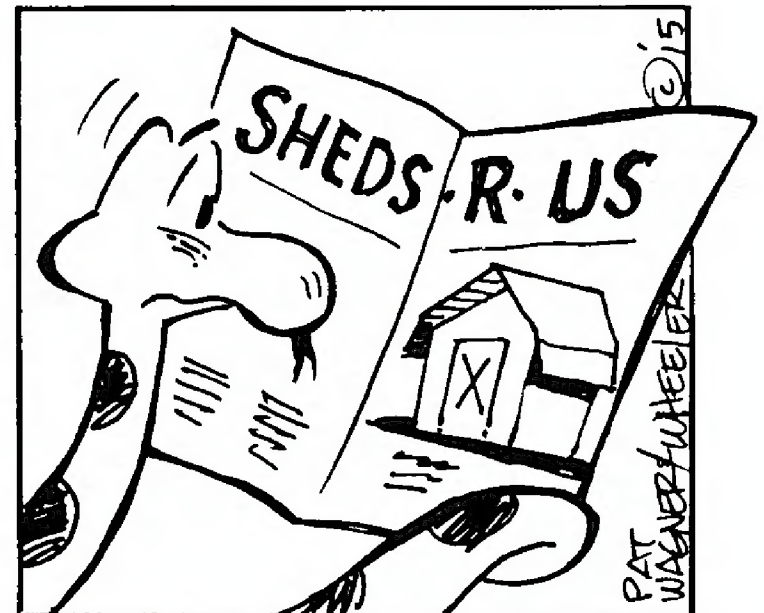
### Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to be held at 7:30 P.M., Friday, July 17, 2015, at the Schaumburg Township District Library, 130 S. Roselle Road, Schaumburg.

### The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the group's Facebook page.

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